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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/269,972	04/08/1999	YUKIO NAKAJIMA	Q53854	1844

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SUGHRUE MION ZINN MACPEAK & SEAS
2100 PENNSYLVANIA AVENUE NW
WASHINGTON, DC 200373202

EXAMINER

GARCIA OTERO, EDUARDO

ART UNIT

PAPER NUMBER

2123

DATE MAILED: 12/18/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/269,972

Applicant(s)

NAKAJIMA, YUKIO

Examiner

Eduardo Garcia-Otero

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 November 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 April 1999 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 8 . 6) ☐ Other: _____

DETAILED ACTION: Final Action (second action on the merits)

Introduction

1. Title is: TIRE DESIGNMETIO, OPIMIZATION ANALYZING APPARATUS, AND STORAGE MEDIUM...
2. First named inventor is: NAKAJIMA
3. Claims 1-19 have been submitted, examined, and rejected.
4. Priority is claimed to PCT/JP97/02783 filed on 08 August 1997.

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5. **Salvendy** refers to Handbook of Industrial Engineering, Second Edition, by Gavriel Savandy, John Wiley & Sons, Inc., 1992, ISBN 0-471-50276-6, pages 962 to 963, seven features of neural network models.
6. **Tucker** refers to The Computer Science and Engineering Handbook, by Allen B. Tucker, Jr. (Editor-in-chief), CRC Press, ISBN: 0-8493-2909-4, 1996, pages 557 to 568, genetic algorithms.

Applicant's REMARKS: I. Formalities, IDS, Duty of Disclosure, Request for Information

7. Applicant has submitted new copies of the documents listed in paper #4 IDS, but that were missing from the file. The Examiner notes that the paper #4 IDS was signed by the previous examiner, and the documents were initialed as considered by the previous examiner. Thus, the record clearly shows that the documents were present in the file at that time. These documents are: "Non-Linear Multi-Variate Analysis-Approach by Neural Network", Hideky Yoyota, p. 11-13 and pp. 162-166, published by Asakura Book Store in 1996; and "Empirical Model-Building and Response Surfaces", Box and Draper,

published by John Wiley & Sons, New York. The Examiner's request for information is satisfied, and the Applicant's courtesy in replacing these misplaced documents is appreciated.

Applicant's REMARKS: II. Objections

8. Applicant persuasively asserts that FIG 1 and FIG 2 are not prior art, in light of the specification. This objection is withdrawn.
9. Applicant has provided a clean copy of claims 15-19, which incorporate previous amendments from an interview, and resolves claim numbering and duplication problems. These objections are withdrawn.
10. Applicant persuasively asserts that the specification's citation of referenced documents properly incorporates non-essential material. This objection is withdrawn.

Applicant's REMARKS: III. Claims 1-19, 112 first paragraph, fourth paragraph

11. Claim 1. Regarding indefiniteness of “**determine a conversion system**”, Applicant persuasively refers to the paragraph bridging pages 49-50 which states, in part, “to determine the conversion system, learning of a corresponding relation between, on the one hand, design parameters of the shape, structure, pattern of the tire an manufacturing conditions, and on the other hand, performances of a tire by the neural network is conducted by using experimental or numerically analytic data in the non-linear calculation unit”. Based on Applicant's assertion, the Examiner will interpret “conversion system” as defined by this portion of the specification.

12. Thus, based on this portion of the specification, a “conversion system” appears to be a neural network system for determining performance of a tire. This definition is supported by specification page 5 first full paragraph.
13. However, **“neural network” is not adequately enabled.** Thus, the indefiniteness rejection is withdrawn, but the lack of enablement rejection is maintained.
14. Page 20 discusses “multi-layered feed forward type neural network”, and FIG 4 shows a multi-layered forward type neural network (“a conceptual structure of a neural network” according to page 24), and FIG 6 shows “a flow of a learning process of the neural network” according to page 24, and the most detailed discussion begins at page 31 “input layer, neurons of the number corresponding to the number of design parameters of the shape...manufacturing conditions...output layers...intermediate layer” through page 34 “non-linear function, f , which represents the characteristics of a neuron”.
15. Salvendy page 962 states **“Neural network models are considered to have the following seven features:** [1] A set of processing units. [2] A state of activation. [3] An output function for each unit. [4] A pattern of connectivity among units. [5] A propagation rule for propagating patterns of activities through the network of connectivities. [6] An activation rule for combining the units impinging on a unit with the current state of that unit to produce a new level of activation for the unit. [7] A learning rule whereby patterns of connectivity are modified by experience.” The specification does not adequately enable most of these features. Specifically, only the “set of processing units” and the “pattern of connectivity” are enabled by the

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specification. Thus, “neural network” is not enabled, and “conversion system” which is defined in terms of “neural network” is not enabled.

16. *In re Wands* (CAFC) 8 USPQ2d 1400, 1404 (9/30/1998) provides an 8 factor test for undue experimentation, and *White Consolidated Industries, Inc. v. Vega Servo-Control Inc.* (CAFC) 218 USPQ 961, 963 (7/25/83) states "in this case ... require from 1-1/2 to 2 manyears of effort, a clearly unreasonable requirement".
17. Claim 2. Claim 2 states “said step (c) comprises”. Thus, the Claim 2 step (c) replaces the Claim 1 step (c). As discussed during the personal interview, Applicant asserts that using the term “further comprising” is not mandatory under 112 4th paragraph. However, 112 4th paragraph (“specify a further limitation”) must be read in light of 112 2nd paragraph (distinctly claim). In general, taking a step (c) from a previous claim and stating that it “comprises” certain steps (sub-steps) may be acceptable, provided the further limitations exist and are distinctly claimed. However, it is not acceptable here under these specific circumstances. Claim 2 does not appear to contain any further limitations.
18. Specifically, Applicant unpersuasively asserts that “**defining** the design parameter of the tire as a design variable” in Claim 2 is a further limitation. This is not clear from the language of the claims. Claim 1, states “**determining** a design parameter of the tire”, and this term does not exist in Claim 2.
19. Claim 2 states “said step (c) comprises”. Thus, the Claim 2 step (c) replaces the Claim 1 step (c).

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20. To be a dependent Claim 2 step (c) must incorporate the “determining” of Claim 1 step (c). Thus, the “defining” of Claim 2 must be interpreted as incorporating the “determining”, and adding a further limitation. This is the interpretation that Applicant proposes. The Examiner finds this proposition unpersuasive for two reasons. First, in light of the specification and in light of the context of the remainder of the claims, these terms appear to have the same meaning. Second, if Applicant’s proposal is accepted, then the Examiner is forced to solve the following equation: “further limitation” EQUALS “defining” MINUS “designing”, and the Examiner would be forced to conclude that Claim 2 is indefinite because the result of this equation is not adequately defined.
21. After careful consideration, the Examiner believes that Claim 2 is not further limiting, but is merely written slightly more clearly, and is not patentably distinct. Additionally, note that similar problems apply to the other sub-steps of Claim 2. **This 112 4th rejection is not withdrawn.**

Applicant’s REMARKS: IV Claims 1-7, 10-13, 15-19 prior art

22. **Remarks, page 5.** The Applicant unpersuasively asserts that Kamegawa does not meet the “determining a conversion system in which a **non-linear correspondence** between design parameters...and performances of the tire is established” limitation of Claims 1 (and of the other claims listed in the heading of this section).
23. Note that Kamegawa does not require a non-linear objective function between design parameters...and performances of the tire. On the contrary, Kamegawa implies (but does not require) that the objective function representing the tire performance is non-linear.

Kamegawa changes the design variable by a unit amount, then calculates the objective function, then uses these the change in the objective function divided by the change in the design variable to calculate a “sensitivity” for each design variable (see Abstract, and see FIG 2). Thus, Kamegawa effectively uses a local “sensitivity” (in place of a local derivative) to predict the maximum of the objective function, then repeats this process until convergence. If the objective function was linear, then local derivatives could be used instead of a locally calculated “sensitivity”.

24. **Remarks, page 6.** Applicant states that “at page 2 of the specification, the related art system uses a genetic algorithm, but encounters the related art “mountain climbing” problem”. This is an oversimplification of what is stated at page 3 of the specification: genetic algorithms usually resolve the local maximum (“mountain climbing”) problem, but may be computationally intense, and calculations may not converge.
25. Thus, while Kamegawa does not specifically require non-linear correspondence, it implicitly discloses both linear and non-linear correspondence. In general, objective functions may contain both linear and non-linear relationships.
26. **Remarks, page 7.** Applicant further unpersuasively distinguishes Kamagawa by asserting “Kamegawa employs deterministic iterative approaches, as opposed to the claimed predictive approaches”. Claim 1 contains no mention of the word “predictive”, and Kamegawa contains no mention of the word “deterministic”, so the Examiner attaches little weight to this portion of this assertion. Kamegawa is clearly iterative, however, any iterative solution implicitly discloses the nested and iterated procedure.

27. Thus, the Applicant's assertions are unpersuasive, and the prior art rejection of Claim 1 is maintained.

28. **Remarks, page 7 to 8**, regarding dependent Claim 3 (and 6 and 18).

29. Applicant unpersuasively asserts that Kamegawa discloses "determining, which is substantially different from predicting". Kamegawa uses local sensitivity to predict the location and optimum value of the objective function, and then determines the actual value of the objective function at the predicted location, and then iterates. Thus, Kamegawa both predicts and determines. This appears to be precisely what is recited in Claim 3, and is a common search strategy. Thus, Applicant's assertion is not persuasive.

30. **Remarks, page 8**, regarding dependent Claim 7 (and 13 and 19).

31. Applicant unpersuasively asserts that Kamegawa does not disclose "selecting two base models". Note that Kamegawa FIG 39A element 208 states "SELECT FROM N MODELS TWO MODELS TO BE CROSSED OVER FROM FITNESS FUNCTIONS".

32. Applicant unpersuasively asserts that Kamegawa does not disclose "adaptive function".

Please note that Kamegawa FIG 39 A element 216 states "TO BE MUTATED", and element 220 states "USE MUTATES MODELS". This is an adaptive function.

Additionally, Kamegawa FIG 39A element 210 states "TO BE CROSSED OVER" and element 214 states "GENERATE TWO NEW MODELS". This is also an adaptive function. In general terms, the base models are adapted (crossed over or mutated) into new models, which is the essence of genetic algorithms. Please see Tucker, which is provided as a supporting reference, particularly pages 557 and 559 regarding crossover and mutation.

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33. **Remarks, page 8**, regarding dependent claim 11.

34. Applicant unpersuasively asserts that Kamegawa fails to disclose a non-linear correspondence relation between the design parameters and the performance. As discussed above, Kamegawa is implicitly designed for both linear and non-linear objective functions.

Applicant's REMARKS: V. Claims 8 and 14 prior art

35. **Remarks, page 10-11**, regarding dependent Claim 8 (and 14).

36. Applicant unpersuasively asserts that there is no motivation to combine because Kamegawa does not apply predictive capabilities, and cannot handle non-linear situations. The Examiner believes that Kamegawa discloses predictive and discloses non-linear, as discussed above.

37. Applicant unpersuasively asserts that neither Kamegawa nor Tang disclose "has learned so as to convert the design parameters of the tire to performances thereof". Note that Kamegawa at Abstract discloses "an objective function representing a physical amount for evaluating tire performance".

38. Thus, Kamegawa and Tang combine with motivation to disclose all the elements of Claim 8.

Applicant's REMARKS: VI. Conclusion

39. The rejection of Claim 1 for indefiniteness regarding "determine a conversion system" has been withdrawn based on Applicant's referral to the specification paragraph bridging pages 49-50: ""to determine the conversion system, learning of a corresponding relation between, on the one hand, design parameters of the shape, structure, pattern of the tire an

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manufacturing conditions, and on the other hand, performances of a tire by the neural network is conducted by using experimental or numerically analytic data in the non-linear calculation unit". Based on Applicant's assertion, the Examiner will interpret "conversion system" as defined by this portion of the specification.

- 40. All other rejections are maintained.
- 41. The objections regarding improper incorporation, and regarding prior art in drawings have been withdrawn in light of Applicant's assertions.
- 42. Some supporting references are provided with this action regarding genetic algorithms and neural networks.

FINAL OFFICE ACTION

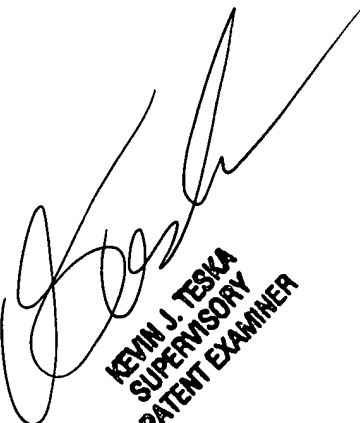
- 43. THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).
- 44. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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Communication

45. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eduardo Garcia-Otero whose telephone number is 703-305-0857. The examiner can normally be reached on Monday through Thursday from 9:00 AM to 7:00 PM.
46. If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Kevin Teska, can be reached at (703) 305-9704. The fax phone numbers for this group are:
47. (703) 746-7238 --- for communications after a Final Rejection has been made;
48. (703) 746-7239 --- for other official communications; and
49. (703) 746-7240 --- for non-official or draft communications.
50. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the group receptionist, whose telephone number is (703) 305-3900.

* * * *



KEVIN J. TESKA
SUPERVISORY
PATENT EXAMINER